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Title: Surface Analysis of TMSDMA Molecules Adsorbed on SiO₂/Si Substrates for Area Selective Deposition

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Abstract: Area-selective atomic layer deposition (AS-ALD) is used by the semiconductor industry for bottom-up manufacturing of semiconductor devices. One technique to achieve selectivity is to adsorb a molecular film to regions of a patterned substrate to block the adsorption of another species. N-(Trimethylsilyl)Dimethylamine (TMSDMA) has a strong affinity for chemisorption on SiO₂ surfaces while having low affinity for chemisorption on Si and non-oxidized metal surfaces. Therefore, it can be used to block deposition of metals on SiO₂, while allowing deposition of metals on Si or metal surfaces. Samples of TMSDMA adsorbed on Si(100) substrates with a 1000 thermal oxide and various post-exposure surface treatments have been prepared by the Thin Films group at TEL. Surface treatments include ozone exposure, H₂ plasma treatment, H₂ plasma treatment followed by H₂O vapor, and NF₃ exposure. Water contact angle measurements were taken of each sample to qualitate relative surface passivation and changes in the inhibiting layer. In addition, X-Ray photoelectron spectroscopy is being used to determine the chemical state of the TMSDMA molecules after surface treatments.